List of Contents

NUMBER 1

P. G. J. Irwin, S. B. Calcutt, and **F. W. Taylor**	1	Characterization of the thermodynamic behaviour of pressure modulated cells for remote sensing of the atmosphere of Mars
C. Lavín and **I. Martin**	21	Relativistic quantum defect orbital calculations on triplet–triplet transitions in cadmium-like ions
Larry S. Zelson, David F. Davidson, and **Ronald K. Hanson**	31	V.u.v. absorption diagnostic for shock tube kinetics studies of C_2H_4
V. I. Lang	45	Vacuum u.v. absorption coefficients of hydrazines
Deru Qin and **Peter R. Griffiths**	51	Minimization of quantitative errors for analysis of vapor-phase infrared spectra measured at different temperatures by partial least squares regression
J. Pessoa-Filho and **S. T. Thynell**	59	Development of approximate solutions to radiative transfer in slabs and spheres
Kuldip Singh and **James J. O'Brien**	75	Measurement of pressure-broadening and lineshift coefficients at 77 and 296 K of methane lines in the 727 nm band using intracavity laser spectroscopy
J. R. Crespo López-Urrutia, M. Ulbel, T. Neger, and **H. Jäger**	89	Transition probabilities and branching ratios of Co II lines
Michael I. Mishchenko	95	Asymmetry parameters of the phase function for densely packed scattering grains
J. R. Crespo López-Urrutia, B. Kenner, T. Neger, and **H. Jäger**	111	Absolute transition probabilities of Cu II lines
S. G. Chen, B. Y. Shao, I. Impens, and **R. Ceulemans**	115	Effects of plant canopy structure on light interception and photosynthesis
Corrigendum	125	

NUMBER 2

Carlos A. Iglesias and **Brian G. Wilson**	127	Statistical simulation of atomic data in opacity calculations
Zhenhua Li and **Prasad Varanasi**	137	Measurement of the absorption cross-sections of CFC-11 at conditions representing various model atmospheres

N. S.-K. Sze and **A. S.-C. Cheung** 145 Laser spectroscopic study of the $A\,^4\Pi$–$X\,^4\Sigma^-$ transition of MoN

J. J. Oh and **E. A. Cohen** 151 Pressure broadening of ClO by N_2 and O_2 near 204 and 649 GHz and new frequency measurements between 632 and 725 GHz

C. E. Siewert 157 A radiative-transfer inverse-source problem for a sphere

J. F. Babb, Zhuang Fan, and **A. Dalgarno** 161 The radiative association of O and O^+

Xinming Zhu, Abdullahi H. Nur, and **Prabhakar Misra** 167 Laser optogalvanic wavelength calibration with a commercial hollow cathode iron–neon discharge lamp

T. H. Gogel, A. Sedghinasab, and **D. R. Keefer** 179 Radiation transfer computation in cylindrical arc columns using a Monte Carlo method

J. J. Settle 195 Some properties of an integral that occurs in problems of radiative transfer

N. A. Silant'ev 207 Radiative transfer in atmospheres with the Faraday rotation

NUMBER 3/4

ATMOSPHERIC SPECTROSCOPY APPLICATIONS

229 Preface

ATMOSPHERIC OBSERVATIONS

M. Van Roozendael, M. De Mazière, and **P. C. Simon** 231 Ground-based visible measurements at the Jungfraujoch station since 1990

C. P. Rinsland, G. K. Yue, M. R. Gunson, R. Zander, and **M. C. Abrams** 241 Mid-infrared extinction by sulfate aerosols from the Mt Pinatubo eruption

Georg Echle, Hermann Oelhaf, and **Andreas Wegner** 253 On the potential of i.r. limb emission spectroscopy for the measurement of the stratospheric composition

D. W. Arlander, A. Barbe, M. T. Bourgeois, A. Hamdouni, J.-M. Flaud, C. Camy-Peyret, and **Ph. Demoulin** 267 The identification of $^{16}O^{18}O^{16}O$ and $^{16}O^{16}O^{18}O$ ozone isotopes in high resolution ground-based FTIR spectra

C. P. Rinsland, A. Goldman, F. J. Murcray, S. J. David, R. D. Blatherwick, and **D. G. Murcray** — 273 Infrared spectroscopic measurements of the ethane (C_2H_6) total column abundance above Mauna Loa, Hawaii—seasonal variations

LINESHAPES AND CONTINUA

L. Larrabee Strow, David C. Tobin, and **Scott E. Hannon** — 281 A compilation of first-order line-mixing coefficients for CO_2 Q-branches

A. A. Vigasin, T. G. Adiks, E. G. Tarakanova, and **G. V. Yukhnevich** — 295 Simultaneous infrared absorption in a mixture of CO_2 and H_2O: the role of hydrogen-bonded aggregates

T. Gabard and **J. P. Champion** — 303 Calculation of collision induced energy transfer rates in tetrahedral molecules. Application to $^{12}CH_4$ perturbed by argon

LABORATORY DATA

A. Perrin, J.-M. Flaud, C. Camy-Peyret, A. Goldman, C. P. Rinsland, and **M. R. Gunson** — 319 Identification of the HNO_3 $3\nu_9-\nu_9$ band Q branch in stratospheric solar occultation spectra

P. Varanasi, Z. Li, V. Nemtchinov, and **A. Cherukuri** — 323 Spectral absorption-coefficient data on HCFC-22 and SF_6 for remote sensing applications

V. Dana, J.-Y. Mandin, A. Barbe, J.-J. Plateaux, L. S. Rothman, and **R. B. Wattson** — 333 $^{12}C^{16}O_2$ line intensities in the 4.8 μm spectral region

A. Barbe, J. J. Plateaux, S. Bouazza, O. Sulakshina, S. Mikhailenko, V. Tyuterev, and **S. Tashkun** — 341 Experimental and theoretical study of absolute intensities of ozone spectral lines in the range 1850–2300 cm^{-1}

Aaron Goldman, James R. Gillis, Curtis P. Rinsland, and **James B. Burkholder** — 357 Improved line parameters for the $X^2\Pi-X^2\Pi$ (1–0) bands of ^{35}ClO and ^{37}ClO

J. Boissoles, R. Le Doucen, F. Thibault, and **C. Boulet** — 361 The $3\nu_3$ band of CO_2—influence of the pressurized perturber gas

A. Goldman, C. P. Rinsland, F. J. Murcray, R. D. Blatherwick, and **D. G. Murcray** — 367 High resolution studies of heavy NO_y molecules in atmospheric spectra

TECHNIQUES AND MISCELLANEOUS

Matthew J. Schurman, Vanja Dunjko, Steve Goldstein, Marcus Baron, and **A. W. Mantz** — 379 Line strengths for $\Delta\nu_3 = 1$ transitions in isotopic CS_2 species with a stabilized tunable diode laser

NON-LTE

David P. Edwards, Manuel López-Puertas, and Martin G. Mlynczak — 389 — Non-local thermodynamic equilibrium limb radiance from O_3 and CO_2 in the 9–11 μm spectral region

M. López-Puertas, P. P. Wintersteiner, R. H. Picard, J. R. Winick, and R. D. Sharma — 409 — Comparison of line-by-line and Curtis matrix calculations for the vibrational temperatures and radiative cooling of the CO_2 15 μm bands in the middle and upper atmosphere

SPECTROSCOPIC DATABASES

N. Husson, B. Bonnet, A. Chédin, N. A. Scott, A. A. Chursin, V. F. Golovko, and Vl. G. Tyuterev — 425 — The GEISA data bank in 1993: a PC/AT compatible computers' new version

H. Vilanove, M. Jacon, and J. R. Jevais — 439 — High temperature infrared spectrum of the N_2O molecule

K. Chance, K. W. Jucks, D. G. Johnson, and W. A. Traub — 447 — The Smithsonian Astrophysical Observatory Database SAO92

Vl. G. Tyuterev, Yu. L. Babikov, S. A. Tashkun, V. I. Perevalov, A. Nikitin, J.-P. Champion, Ch. Wenger, C. Pierre, G. Pierre, J.-C. Hilico, and M. Loete — 459 — T.D.S. spectroscopic databank for spherical tops: DOS version

R. R. Gamache, J.-M. Hartmann, and L. Rosenmann — 481 — Collisional broadening of water vapor lines—I. A survey of experimental results

S. T. Massie — 501 — Indices of refraction for the HITRAN compilation

NUMBER 5

Michael D. Di Rosa and Ronald K. Hanson — 515 — Collision broadening and shift of NO $\gamma(0, 0)$ absorption lines by O_2 and H_2O at high temperatures

A. Djaoui, S. J. Rose, and J. S. Wark — 531 — Calculation of the effects of velocity gradients and opacity on line transfer in laser-produced plasmas

P. J. Morris, W. Lüthy, H. P. Weber, S. Ya. Rusanov, A. I. Zagumenyi, I. A. Shcherbakov, and A. F. Umyskov — 545 — Is a cw 3 μm holmium laser possible? A spectroscopic study

W. A. van Wijngaarden and J. Li — 555 — Polarizabilities of cesium S, P, D, and F states

Larry L. Gordley, Benjamin T. Marshall, and **D. Allen Chu** — 563 LINEPAK: algorithms for modeling spectral transmittance and radiance

Benjamin T. Marshall, Larry L. Gordley, and **D. Allen Chu** — 581 BANDPAK: algorithms for modeling broadband transmission and radiance

J. Z. Klose, T. M. Deters, J. R. Fuhr, and **W. L. Wiese** — 601 Atomic branching ratio data for oxygen-like species

Maxim V. Spiridonov, Susan McKenna-Lawlor, and **Serguey Y. Savinov** — 621 Diagnostics of the active medium of a waveguide CO_2 laser: vibrational distributions and plasma-chemical processes

M. Korek and **H. Kobeissi** — 631 New analytical expressions for the Herman–Wallis coefficients of infrared transitions up to the third order

H. K. Roscoe, J. A. C. Squires, D. J. Oldham, A. Sarkissian, J.-P. Pommereau, and **F. Goutail** — 639 Improvements to the accuracy of zenith-sky measurements of total ozone by visible spectrometers

A. M. Lee, H. K. Roscoe, D. J. Oldham, J. A. C. Squires, A. Sarkissian, J.-P. Pommereau, and **B. G. Gardiner** — 649 Improvements to the accuracy of measurements of NO_2 by zenith-sky visible spectrometers

S. Hirsch and **G. Himmel** — 659 Determination of r.f.-electric field amplitudes and electron densities in an overdense microwave produced helium discharge

G. Buffa, M. Lucchesi, O. Tarrini, and **M. Martinelli** — 673 Collisional shift of $^{15}NH_3$ ammonia inversion spectrum

J. Ballard, K. Strong, J. J. Remedios, M. Page, and **W. B. Johnston** — 677 A coolable long path absorption cell for laboratory spectroscopic studies of gases

S. A. El-Wakil, K. Razi Naqvi, E. M. Abulwafa, A. R. Degheidy, and **A. El-Shahat** — 693 Radiative transfer in turbid media with specular reflection at boundaries

NUMBER 6

Christian Parigger, David H. Plemmons, James O. Hornkohl, and **J. W. L. Lewis** — 707 Spectroscopic temperature measurements in a decaying laser-induced plasma using the C_2 Swan system

R. L. Dougherty, B. J. Ackerson, N. M. Reguigui, F. Dorri-Nowkoorani, and U. Nobbmann	713	Correlation transfer: development and application
Joseph Nilsen, L. A. Vainshtein, I. A. Ivanov, U. I. Safronova, J. Dubau, and M. Cornille	729	Comparison of autoionization rates for $3l3l'$ states of two electron systems
M. B. Das	743	Experimental lifetimes of some excited states of XeII
K. Dzierżęga and K. Musioł	747	Stark broadening and shift for ArII lines
H. Y. Li	755	Estimation of the temperature profile in a cylindrical medium by inverse analysis
D. Scutaru, L. Rosenmann, and J. Taine	765	Approximate intensities of CO_2 hot bands at 2.7, 4.3, and 12 μm for high temperature and medium resolution applications
M. W. Markus and P. Roth	783	A quantitative ring dye laser absorption diagnostic for free SiH_2 ($\tilde{X}\,^1A_1$) radicals at high temperatures
J. M. Zhang and W. H. Sutton	791	Multidimensional radiative transfer in absorbing, emitting, and linearly anisotropic scattering cylindrical medium with space-dependent properties
B. B. Radak, J. I. Lunine, D. M. Hunten, and G. H. Atkinson	809	The intensity and pressure broadening of the 681.884 nm methane absorption line at low temperatures determined by intracavity laser spectroscopy
Sibylle Günter and Axel Könies	819	Quantum mechanical electronic width and shift of spectral lines over the full line profile—electronic asymmetry
Axel Könies and Sibylle Günter	825	Asymmetry and shifts of the L_α- and the L_β-line of hydrogen
M. Cattani	831	Racemization and weak interactions: a two-level approach
G. C. Herring and B. W. South	835	Pressure broadening of vibrational Raman lines in N_2 at temperatures below 300 K
Andreas F. Molisch, Bernhard P. Oehry, Walter Schupita, Brigitte Sumetsberger, and Gottfried Magerl	841	Efficient computation of simultaneous radiation-trapping and particle diffusion in an atomic vapor
G. Cazzoli, L. Cludi, G. Cotti, C. Degli Esposti, G. Buffa, and O. Tarrini	847	Pressure broadening by oxygen and nitrogen of the rotational spectrum of CHF_2Cl (HCFC-22) in the millimeter and submillimeter wave region

B. Rutily and **J. Bergeat** 857 The solution of the transfer equation in a homogeneous isotropically scattering plane-parallel medium

I. S. Fishman, E. V. Sarandaev, and **M. Kh. Salakhov** 887 Experimental determination of the Stark parameters of PbI, PbII, and CuII spectral lines in a plasma of the pulse capillary discharge

Notes

J. M. Midha and **S. C. Gupta** 897 Charge exchange cross-sections for multiply charged ions colliding with hydrogen atom

Kenichi Iwamoto and **Akira Matsumoto** 901 Franck–Condon factors involving the Morse potential